

Effect of Cholecystectomy on Serum Lipid Profile in Gallstone Patients: A Comparative Study

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ABSTRACT

Background: Gallstones represent the calcified aggregations of the bile (digestive fluid) that can form inside the gallbladder. A positive association of occurrence of gallstone diseases and lower levels of high-density lipoprotein cholesterol (HDL-c) and high triglycerides has also been demonstrated in the past literature.⁷ In the recent reports, the topic of research has been the association of cholesterol gallstones and means serum lipid profile. Hence; we planned the present study to assess the correlation between the serum lipid profile and occurrence of cholesterol gallstones.

Materials & Methods: We planned the present study evaluate of serum lipid profile in gallstone patients. A total of 50 gallstone patients and 50 normal healthy controls were included in the present study. Complete demographic details of all the patients along with detailed history were obtained. Haematological investigations were performed in all patients before the starting of the surgery. Fasting serum lipid profile was obtained in all the patients. All the patients underwent laparoscopic cholecystectomy under the hands of skilled and experienced surgeons. Blood samples were taken thrice in all the patients. First sample was taken preoperatively, second sample was taken at 72 hours postoperatively and the third sample was taken at 20 days postoperatively. All the samples were subjected to analysis by Autoanalyzer machine. All the results were analyzed by SPSS software.

Results: Significant results were obtained while comparing the preoperative lipid profile in between the study group and the control group. Significant results were obtained while comparing the lipid profile pre-operatively and post-operatively on third day. A further significant decrease in the lipid profile was seen at twenty day time.

Conclusion: Consideration of gallstones as a marker of metabolic pathology should be done and, therefore, treatment should be carried accordingly.

Key words: Gallstones Diseases, Lipid Profile.

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INTRODUCTION

Cholelithiasis or Gallstones represent the calcified aggregations of the bile (digestive fluid) that can form inside the gallbladder. Considerable variation exists in their shape and size. Imbalance in the chemical constituents of the bile results in the formation of gallstones, in the presence of one or more precipitating factors.¹ Recently, there has been an increase in the incidence of gallstones, irrespective of the age of the patient.² In patients with suspected gallstone diseases, surgeon should carry out necessary liver function tests and radiographic (ultrasound) investigations.³

Special emphasis is given to the character played by serum lipid profile in the etio-pathogenesis of gallstone diseases, in particular

when the alteration in the lipid profile is suggesting the presence of any form of metabolic syndrome.⁴ As demonstrated by the past literature, presence of metabolic syndrome is considered as a risk factor for the presence of cholelithiasis.^{5,6}

A positive association of occurrence of gallstone diseases and lower levels of high-density lipoprotein cholesterol (HDL-c) and high triglycerides has also been demonstrated in the past literature.⁷ In the recent reports, the topic of research has been the association of cholesterol gallstones and means serum lipid profile. Hence; under the light of above mentioned data, we planned the present study to assess the correlation between the serum lipid profile and occurrence of cholesterol gallstones.

MATERIALS & METHODS

We planned the present study in the department of general surgery, Rama Medical College Hospital and Research Centre, Hapur, UP, India. It included evaluation of serum lipid profile in gallstone patients. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol.

Sample Size

- 50 gallstone patients
- 50 normal healthy controls

Exclusion Criteria

- Patients less than 20 years of age
- Patients more than 60 years of age
- Patient on lipid lowering agents
- Patients with history of renal failure, nephrotic syndrome, pancreatitis, cardiac failure, morbid obesity or any other immunocompromised.

Methodology

Complete demographic details of all the patients along with detailed history were obtained. Haematological investigations were performed in all patients before the starting of the surgery. Fasting serum lipid profile was obtained in all the patients. All the patients underwent laparoscopic cholecystectomy under the

hands of skilled and experienced surgeons. Blood samples were taken thrice in all the patients. First sample was taken preoperatively, second sample was taken at 72 hours postoperatively and the third sample was taken at 20 days postoperatively. All the samples were subjected to analysis by Autoanalyzer machine.

Statistical Analysis

All the results were analyzed by SPSS software. Student t test and chi-square test were used for assessment of level of significance. P-value of less than 0.05 was taken as significant.

RESULTS

A total of 100 subjects were included in the present study and were divided into two study groups. Study group included gallstone patients who underwent laparoscopic cholecystectomy while control group included patients without gallstone disease. Mean age of the patients of the study group and control group was 43.5 years and 44.1 years respectively. Significant results were obtained while comparing the preoperative lipid profile in between the study group and the control group. Significant results were obtained while comparing the lipid profile pre-operatively and post-operatively on third day. A further significant decrease in the lipid profile was seen at twenty day time.

Table 1: Demographic details of the patients included in the present study

| Parameter | Study group | Control group |
|-------------|-------------|---------------|
| Age (years) | 43.5 | 44.1 |
| Males | 14 | 20 |
| Females | 36 | 30 |

Table 2: Comparison of serum lipid profile in between study group and control group

| Parameter | Study group | Control group | P- value |
|------------------|-------------|---------------|----------|
| Preoperative TC | 170.25 | 153.20 | 0.01* |
| Preoperative TG | 148.52 | 129.57 | 0.02* |
| Preoperative LDL | 96.62 | 75.22 | 0.01* |
| Preoperative HDL | 41.02 | 48.25 | 0.04* |

*: Significant; TC: Total cholesterol; TG: Triglycerides; LDL: Low density lipoproteins; HDL: High density Lipoproteins

Table 3: Comparison of lipid profile in the study group at different time intervals

| Parameter | Pre-operative time | Post-operative Third day time | P- value | Post-operative twenty day time | P- value |
|-----------|--------------------|-------------------------------|----------|--------------------------------|----------|
| TC | 170.25 | 166.25 | 0.01* | 160.25 | 0.00* |
| TG | 148.52 | 147.25 | 0.28 | 138.25 | 0.00* |
| HDL | 96.62 | 48.25 | 0.01* | 44.12 | 0.00* |
| LDL | 41.02 | 90.25 | 0.02* | 80.25 | 0.00* |

DISCUSSION

Gallstone diseases represent one of the commonest forms of digestive disorders accounting for approximately one tenth of all digestive diseases in the western world. Cholesterol gallstones represent the most common type of gallstone diseases.^{8,9} Gallbladder motility is significant for averting crystallization and precipitation of surplus cholesterol in gallbladder bile. There is enlargement of gallbladder volume during fasting. Compromised postprandial gallbladder draining, frequently existing in cholesterol gallstone subjects, might extend seating of bile in the gallbladder, therefore permitting more time for nucleation of cholesterol crystals from supersaturated bile and their growth/aggregation into macroscopic stones. In the gallbladder, from supersaturated bile,

it appears that crucial absorption of cholesterol occurs.¹⁰⁻¹² Hence; we planned the present study to assess the correlation between the serum lipid profile and occurrence of cholesterol gallstones.

In the present study, we observed that gallstones diseases were more prevalent among females in comparison to males. This is in correlation with the results obtained with previous studies and might be attributed to the hormonal differences between males and females.¹³

We also observed low serum HDL levels and high serum triglyceride, total cholesterol and LDL levels in patients with gallstone diseases in comparison to the control group. Our results were in concordance with the results obtained in the previous studies.¹³⁻¹⁵

In one of the previous studies, Cortés V et al evaluated the impact of cholecystectomy on the hepatic profile of Hispanic subjects. They analyzed a total of 26 patients with gallstone disease who underwent elective cholecystectomy. They also evaluated 16 healthy controls and concluded that at cholecystectomy is a risk factor non-alcoholic fatty liver disease.¹⁶ Jindal N assessed the serum lipid profile in gallstone patients. They evaluated a total of 71 gallstone patients and 96 patients without gallstones and investigated their mean serum lipid profile. They observed that serum lipid levels of gallstone patients were significantly higher in comparison to patients without gallstone diseases. From the results, the authors concluded that metabolic disorders do alter the lipid profile in gallstone patients.¹⁷ Atamanalp SS et al examined the impact of serum lipid profile on gallstone cholesterol concentration. In 75 patients with gallstones, they inspected using spectrophotometry. They observed that high cholesterol stone rates were associated with High serum cholesterol and LDL levels. From the results, they concluded that the association between cholesterol, LDL, and HDL levels and cholesterol gallstone formation is multifactorial and complex and is also dependent on other individual properties.¹⁸ Khokhlacheva NA et al assessed the properties of liver bile and lipid profile in patients undergoing laparoscopic cholecystectomy. They spent the unpredictable examination of physical-concoction characteristics of bile and lipid levels in 210 patients with cholelithiasis group I (pre-stone) and in 90 patients with cholelithiasis group II and III (with gallstones) after cholecystectomy. In all analyzed patients we uncovered aggravations of physical-concoction characteristics of bile and lipid trade. With relationship examination it was discovered that bile lithogeneity increments in high bile thickness, in advancing of aggravation process in bile pipes, in progressing of aterogene parts of blood cholesterol. After cholecystectomy in liver-cells dyscholia the capacity to stones development preserves. It implies that patients after cholecystectomy require in catching up with utilizing of prophylactic measures to reestablishing of bile-formation.¹⁹ Batajoo H et al (2013) thought about the serum lipid variations from the normal in females who have cholelithiasis with controls. A review investigation of females who experienced cholecystectomy for gallstone ailment was done. An aggregate of 133 patients were partitioned into two age groups ≤ 40 and >40 years. In age group ≤ 40 years, there were 72 cases without any controls, while, in >40 years, 61 cases were contrasted and 67 controls. The serum lipid profile was gathered and contrasted concurring with the age group. The investigation demonstrated that serum LDL level was measurably noteworthy in females >40 years old, though different parameters were not factually altogether different.²⁰

CONCLUSION

From the above results, the authors conclude that consideration of gallstones as a marker of metabolic pathology should be done and, therefore, treatment should be carried accordingly. However; future studies are recommended.

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